VSR://EDU/SSE

Software Service Engineering

WS 2019/2020 – 7. Tutorial

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1 Task 1

- Answer the following questions:
  - What is an architecture style?
  - What are the REST constraints?
    Which properties do they induce?
  - What is the “Hypermedia” constraint and
    which examples of its application do you know?

- What is an architecture style?

  An architectural style is a coordinated **set of architectural constraints** that restricts the roles/features of architectural elements and the **allowed relationships** among those elements within any architecture that conforms to that style.

- Why someone decides to adhere to certain architecture style?

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- What are the REST constraints?
  - Client-Server
  - Stateless
  - Cache
  - Uniform interface
    - Identification of resources
    - Manipulation of resources through representations
    - Self-descriptive messages
    - Hypermedia as the engine of application state
  - Layered system
  - Code-on-demand

- Client-Server
  - Portability (server responses are understood by all clients)
  - Scalability (server outsources part of logic to client)
- Stateless
  - Visibility (request analysis is possible)
  - Reliability (request can be easily repeated in case of failures)
  - Scalability (no persistent storage on the web needed)
  - But: amount of data transferred increases, correct client implementation required
- Cache
  - Scalability (servers are requested not so often)
  - But: reliability can decrease (if cached data differs from original)

- Uniform interface
  - Simplicity (one protocol to learn)
  - Visibility (everyone understands the protocol)
  - Independent evolvability (implementations behind interface can change)
  - But: performance drawbacks because of interface transformation
- Layered System
  - Simplicity (layering of services, request optimization)
  - Scalability (load balancing)
  - But: additional latency
- Code-on-Demand
  - Simplicity (clients can be enriced with functionality)
  - But: reduced visibility (code can be arbitrary)

Performance

...The primary measures for user-perceived performance are latency and completion time...

Scalability

...ability of the architecture to support large numbers of components, or interactions among components, within an active configuration...

Simplicity

...individual components are substantially less complex, then they will be easier to understand and implement..

Modifiability (evolvability, extensibility, customazability, configurability, reusability)

...the ease with which a change can be made to an application architecture...

Visibility

...ability of a component to monitor or mediate the interaction between two other components...

Portability

...Software is portable if it can run in different environments...

Reliability

...the degree to which an architecture is susceptible to failure at the system level in the presence of partial failures within components, connectors, or data...

	Client-Server	Stateless Server	Cache	Uniform Interface	Layered System	Code on demand
Performance						
Scalability						
Simplicity						
Modifiability						
Visibility						
Portability						
Reliability						

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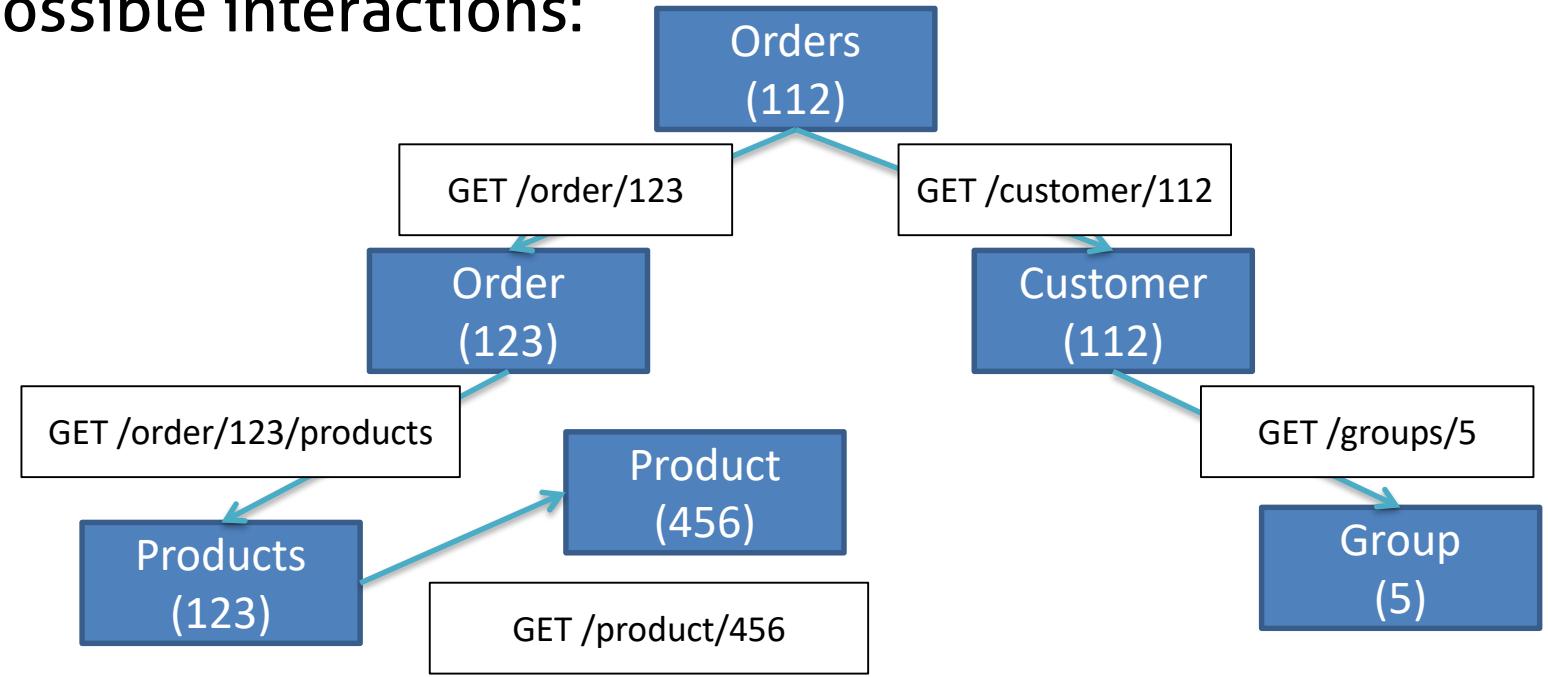
Part of the uniform interface constraint

Resource representations should expose further possible interactions:



Content-Negotiation:

- Clients indicate their preferences on representation format, language, time of the representation:
  - Accept: text/html;
  - Accept-Language: de;
  - Accept-Datetime: Thu, 31 May 2007 20:35:00 GMT
- Servers responds according to the client request

Task 2

SOAP Operation	HTTP Verb	URL	Request Header	Request Body	Response Header	Response Body
getAllBooks	GET	/books	Accept: */*	-	Content-Type: application/xml	<books><book> <title>...</title> <authors>...</authors> </book></books>
getAllBooksAsJson	GET	/books	Accept: application/json	-	Content-Type: application/json	{"books": [{ "book": { "title": "...", "authors": "..."}}]}
getBookById(bookId: int; language: {en, de, fr, nl})	GET	/books/{bookId}	Accept-Language: en-US; Accept: */*	-	Content-Type: application/xml	<book> <title>...</title> <authors>...</authors> </book>
updateBook(bookId: int; book: (title, authors))	PUT	/books/{bookId}	Content-Type: application/xml	<book> <title>...</title> <authors>...</authors> </book>	Content-Type: application/xml	<book> <title>...</title> <authors>...</authors> </book>
getAllCategories	GET	/categories	Accept: */*	-	Content-Type: application/xml	<category> <title>...</title> </category>
getBooksInCategory (categoryId: int)	GET	/categories/{categoryId}/books	Accept: */*	-	Content-Type: application/xml	<books><book> <title>...</title> <authors>...</authors> </book></books>
addBook(categoryId: int; book: (title, authors))	POST	/categories/{categoryId}/books	Content-Type: application/xml	<book> <title>...</title> <authors>...</authors> </book>	Location: /books/{newId}	-

Task 3

In the template *Task3-Template.zip* you will find a REST/HTTP Web service operating on a single resource – User = (**int** id, **string** name).
Extend the service towards management of user bookmarks, with Bookmark = (**int** id, **string** url).
Following operations should be implemented:

- Read all bookmarks / Search bookmarks by keyword
- Create a bookmark assigned to a user
- Delete a bookmark
- Read bookmarks of a given user

4 Homework

Extend the service and the client from the task 3 with the following functionality:

- Bookmarks should be able to be assigned to Categories = (**int** id, **string** name).
- All categories can be listed
- Bookmarks of a given category can be listed
- Categories can be searched by a keyword

VSR

Your feedback on today's session:

mytuc.org/tgxs

Questions?

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